of plants in relation to others and to geographic and climatological features. If any one desires to see what this suggestion means in detail he would do well to examine the first volume of this projected *Vegetation der Erde*, namely, Willkomm's *Grundzüge der Pflanzenverbreitung auf der iberischen Halbinsel*.[5]

The Iberian peninsula is particularly well suited for a special study of this kind, cut off as it is from the rest of Europe by the Pyrenees. While its limit is thereby defined its interior presents exceedingly diversified conditions, the rainfall alone varying from less than 300 mm in small regions about Salamanca and Lérida, to over 1600 mm about Santiago and Roncesvalles, while a large part of the table-land of Old Castile, New Castile, and Aragon receive less than 400 mm. With six mountain systems, in five of which peaks and chains reach the alpine region, and in one the snow-line with peaks of 11,000 feet; with a coast line of 2250 miles, sometimes abrupt, sometimes sand dunes backed by marshes, as diversified a surface as can well be imagined is presented.

After giving an account of the history and literature of botanical exploration in the peninsula and its physical features, Willkomm discusses the peculiarities of the combination of the Iberian flora and its biological statistics; the distribution of the plant formations; the limits of various species whose polar or equatorial limit is therein reached; and the relation of the Spanish-Portuguese flora to that of neighboring countries and islands.

The second part, which constitutes the larger part of the book, depicts the formations and the collective vegetation in each of the five districts into which he divides the region, viz., the Pyrenaic, North Atlantic, central Mediterranean, south Atlantic, and west Atlantic. An appendix treats of the changes in the vegetation through cultivated and adventive plants.

It is impossible for any foreigner to criticise such a work, whose details must be tested by local botanists; but it cannot fail to leave an impression of great thoroughness. To it the venerable author had devoted a good share of his life. It was fortunate indeed for us that he was able to complete the manuscript and to see more than half of it through the press before his death a few months ago. A more auspicious beginning of Engler and Drude's great work could scarcely have been made.

From the publisher's point of view the book is faultless. The two maps, one showing isohyetes and the other the steppes and the vegetation limits, are exquisite specimens of modern cartography.—C. R. B.

MINOR NOTICES.

Dr. T. F. Allen has published another fascicle of his *Characeæ of America*, being part II, fascicle 3. Ten species of *Nitella* are described, and

[5] Willkomm, Moritz. Grundzüge der Pflanzenverbreitung auf der iberischen Halbinsel. 8vo, pp. xvi + 395, *f. 21*, *pl. 2*, *maps 2*. Leipzig: Wilhelm Engelmann. 1896. M. 12 unbound; M. 13.50 bound.

illustrated by nine handsome plates. *N. Leibergi* is a new species from Oregon; *N. transilis* is a new species of the north Atlantic states; and *N. Asagræana* Schaffner, in Herb. Farlow, is Mexican. The other species are *N. mucronata* A. Br., *N. capitellata* A. Br., *N. gracilis* (Smith) Ag., *N. tenuissima* (Desv.) Coss. et Germ., *N. pygmæa* A. Br., *N. minuta* Allen, and *N. intermedia* Nordst.—J. M. C.

THE METROPOLITAN PARK COMMISSION of Massachusetts has issued a catalogue of the flora of the Blue Hills, Middlesex Fells, Stony Brook, and Beaver Brook Reservations, compiled and edited by Mr. Walter Deane. The work could not have been put into more competent hands, as Mr. Deane's acquaintance with the flora of the whole region is most intimate and accurate; and although he insists that the list is but a preliminary one we question whether it is not more complete than most catalogues. The 7508 acres of very diversified territory have furnished a large list of plants, many of which, it is to be hoped, will be carefully guarded. In addition to the vascular plants, the numerous mosses are presented by Edward L. Rand, the Characeæ by J. W. Blankinship, the algæ by F. S. Collins, the lichens by Clara E. Cummings, and the fungi by A. B. Seymour and Flora W. Patterson. The pteridophytes are furnished by G. E. Davenport.—J. M. C.

IN THE SERIES of bulletins issued by the laboratories of Natural History of the State University of Iowa the current number bears the date of February, 1896. Mr. R. I. Cratty makes some useful notes on the aquatic "phenogams" of the state; Mr. Paul Bartsch deals with the Cretaceous flora of western Iowa; Messrs. Ellis and Macbride publish a list of Nicaraguan Hymenomycetes, collected by the university expedition to that country; Mr. B. Shimek notes over fifty species of plants not heretofore recorded as growing in the state, and also new stations for very many of those already recorded, making the very sensible remark, "The object of this list is to add, if possible, to the knowledge of the plants of the state, not to the volume of the nomenclature literature. Therefore, without regard to the present controversy, the nomenclature of the latest edition of Gray's Manual is followed, as the plants will be readily recognized by the names therein given;" and Professor Macbride describes an interesting Nicaraguan puff-ball, *Bovista lateritia* Berk.—J. M. C.

A CONSPICUOUS example of the bookmaker's art is *The White Pine*, by Pinchot and Graves,[6] and this in more senses than one. For the book is scarcely more than a magazine article as to length, by the printer's skill put together most admirably to form a dainty volume. As to contents, its facts and conclusions are confessedly "based . . . on a short period of observation and a comparatively restricted number of measurements." It may be added

[6] PINCHOT, GIFFORD, and GRAVES, HENRY S.—The white pine—a study. With tables of volume and yield. 12mo. pp. xii + 102. New York: The Century Co. 1896.

that these were made in a still more restricted region, viz., the pine forests of Pennsylvania. It is hardly conceivable that tables based on data from 160 trees of which only 100 were over 100 years old, in one of the most unimportant pineries of the country, can be sufficiently well founded to command confidence.

Whatever of good is accomplished by the book will be in showing what forest study aims to do, and how it can be made in this country, as in Europe, of direct commercial value.—C. R. B.

NOTES FOR STUDENTS.

CZAPEK has examined the acid root secretions[7] and found that the commonest source of the acid reaction is primary potassic phosphate, primary potassic oxalate occurring in only a few cases. No free acids, with the exception of carbonic acid, were found.

MM. BERTRAND AND MALÈVRE, whose work upon pectase, a new diastatic enzyme, has already been noticed in this journal, find that it is very widely distributed among plants; so widely that they feel justified in saying that it may be regarded as universally diffused in green plants.[8] It is especially abundant in the leaves and probably spreads to the other organs. It may be prepared from alfalfa or clover by braying in an iron mortar full-grown plants, whose juices are then expressed. This fluid is saturated with chloroform to prevent alteration by micro-organisms and set aside for 12–24 hours in an open flask protected from light. It then undergoes a special coagulation, which renders it easy to filter. To the clear liquid twice its volume of 90 per cent. alcohol is added, which throws down a white precipitate which is collected and dissolved in a little water. After twelve hours it is filtered and the almost colorless liquid which runs through is received in four to five volumes of alcohol. The pectase separates anew and is collected and dried in a vacuum. In this way a liter of juice yields 5–8^{gm} of a white, non-hygroscopic substance, very soluble in water, which produces a vigorous pectic fermentation. A 1 per cent. solution of pectin will be coagulated in forty-eight hours by the addition of $\frac{1}{1000}$ of its weight of the pectase from alfalfa, or $\frac{1}{1600}$ of the pectase from clover.—C. R. B.

MOLISCH describes[9] a new microchemical reaction for chlorophyll, which depends upon a special relation to potassic hydroxide. If a bit of tissue containing chlorophyll, which should not be wet with water, be transferred to a *saturated* watery solution of KOH, the chlorophyll bodies become almost instantly yellow-brown, changing again in 15–30 minutes almost to green. The

[7] Berichte d. deutsch. bot. Gesells. **14**:29. 1896.

[8] Jour. de Bot. —: —. 1896.

[9] Ibid. p. 16.